

Student Name _____

Teacher Name _____

School _____

System _____

BIOLOGY I

ITEM SAMPLER

Tennessee End of Course Assessment
Biology I



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Introduction to Biology I

Content of tests

The testing program titled the *Tennessee End of Course Assessment* was established to meet the Tennessee mandate for end of course assessments in Tennessee secondary schools. These tests measure the Tennessee Performance Indicators. Subject areas covered by the testing program include Mathematics, Language Arts, History, and Science.

Test development

For the *Tennessee End of Course Assessment*, a staff of writers—composed of both teachers and professional test developers experienced in each of the content areas—researched and wrote the items. Professional editors and content specialists carefully reviewed all items and test directions for content and accuracy. To provide a large pool of items for final test selection, the test developers created approximately twice as many items as were needed in the final editions of the tests.

After tryout tests were administered, student responses were analyzed. Professional content editors and researchers carefully reviewed items, their data, and test directions for content, suitability, and accuracy before including particular items and test directions in operational tests.

Test administration

Tennessee End of Course Assessments are given to students as they near the end of courses that are included in the program. Tests may be given midyear for block schedules or near the end of the school year.

Each test contains 65 multiple-choice questions.

Students will have ample time to read and answer each of the questions. The Biology I test has been designed to be administered in one session and is not timed.

Tips for Taking the Test

Preparing for the test

- Review this Tennessee End of Course Item Sampler for Biology I carefully and thoroughly.
- Acquire a Tennessee End of Course Practice Test for Biology I, and take the test several times.
- Become familiar with the correct way to mark answers on the answer sheet. There is a sample answer sheet in the Practice Test.

Before the test

- Get a good night's sleep. To do your best, you need to be rested.

During the test

- Relax. It is normal to be somewhat nervous before the test. Try to relax and not worry.
- Listen. Listen to and read the test directions carefully. Ask for an explanation of the directions if you do not understand them.
- Plan your time. Do not spend too much time on any one question. If a question seems to take too long, skip it and return to it later. Answer all questions you are sure of first.
- Think. If you are not sure how to answer a question, read it again and try your best to answer the question. Rule out answer choices that you know are incorrect and choose from those that remain.

Directions for Using the Item Sampler

This Item Sampler for Biology I provides specific information to students and teachers. It contains examples of different item types for each Performance Indicator that may be tested in any given end of course test administration. Performance Indicators have been grouped under Reporting Categories. These Reporting Categories will be used to report information regarding performance on the end of course tests to students, teachers, schools, and systems.

The items in this Item Sampler will not be found in the end of course tests. The number of items in this Item Sampler does not reflect the emphasis of content on the test. In order to identify the emphasis of content, the End of Course Assessment Practice Test for Biology I should be used. The Practice Test gives a better representation of content emphasis across Reporting Categories and Performance Indicators.

An Answer Key is located on Page 30. Use it to check your answers. Review items that you get wrong.

Reporting Category:
Numbers 1 through 13

Inquiry, Technology and Engineering, Mathematics

Performance Indicator: Select a description or scenario that reevaluates and/or extends a scientific finding.

- 1** A scientist is researching the effect long-term exposure to sunlight has on cell reproduction. Which scenario extends the current understanding of this relationship?
- A** a culture of liver cells exposed to different pH levels over a 10-day period
 - B** a culture of muscle cells exposed to different nutrients over a 30-day period
 - C** a culture of skin cells exposed to different temperatures over a 50-day period
 - D** a culture of brain cells exposed to different electrical impulses over a 75-day period

GS050001

Performance Indicator: Analyze the components of a properly designed scientific investigation.

- 2** When designing a scientific investigation, which of the following should be identified first?
- F** lab equipment needed
 - G** appropriate sample size
 - H** useful analysis software
 - J** a testable hypothesis

GS040186

Performance Indicator: Determine appropriate tools to gather precise and accurate data.

- 3** Which tool would be best to accurately observe the details of organelles in a cell?
- A** electron microscope
 - B** magnifying glass
 - C** dissecting microscope
 - D** compound light microscope

GS040141

Performance Indicator: Evaluate the accuracy and precision of data.

- 4** A group of students in a biology class measured the length of 5 earthworms and recorded their measurements in the table below.

Worm Number	Actual Length (cm)	Student 1	Student 2	Student 3	Student 4
1	8.5	8.0	8.5	8.6	8.5
2	5.5	5.5	6.0	4.8	5.5
3	7.0	7.0	7.1	7.0	6.9
4	6.8	7.0	7.0	6.5	7.0
5	8.3	8.0	8.3	8.5	8.3

Which student made the most accurate measurements of the earthworms?

- F** Student 1
- G** Student 2
- H** Student 3
- J** Student 4

GS050002

Performance Indicator: Defend a conclusion based on scientific evidence.

- 5** In 1928 Alexander Fleming observed the mold *Penicillium notatum* growing in a Petri dish. Also in the dish was the bacteria *Staphylococcus aureus*. Fleming observed that no bacteria colonies were found growing in the area where the *Penicillium notatum* was. Which conclusion is best defended by Fleming's discovery?

- A** *Penicillium notatum* destroys all colonies of *Staphylococcus aureus*.
- B** *Penicillium notatum* prevents the growth of all bacteria.
- C** *Penicillium notatum* inhibits the growth of *Staphylococcus aureus*.
- D** *Penicillium notatum* promotes the growth of certain bacteria colonies.

GS050004

Performance Indicator: Determine why a conclusion is free of bias.

6 A pesticide manufacturer claims that a new product will decrease the pest population 15% more than the current pesticide. A population of 50 beetles of the same species is exposed to the new pesticide for a 10-week period. A separate population of the same species of beetle is exposed to the same amount of the current pesticide for a 10-week period. The data collected is sent to an independent research company to verify the results. Which statement best explains how an independent research company verifies data to ensure unbiased results?

- F** The company compares the data given to similar investigations.
- G** The company performs the same investigation and compares results.
- H** The company sends out the data to another researcher to investigate.
- J** The company tests many types of pesticides and draws its own conclusion.

GS050009

Performance Indicator: Compare conclusions that offer different, but acceptable, explanations for the same set of experimental data.

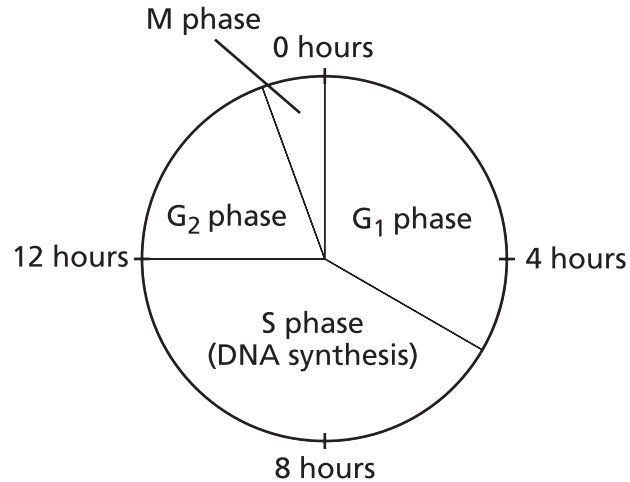
7 A researcher discovers that a cell is using a particular molecule to store energy for time spans longer than several minutes. Which two molecules could possibly be the type of molecule the researcher examined?

- A** ATP or ADP
- B** ATP or carbohydrate
- C** carbohydrate or lipid
- D** lipid or protein

GS050011

Performance Indicator: Interpret a graph that depicts a biological phenomenon.

- 8** A graph showing the time stages of the cell cycle is shown below.



According to the information in the graph, the S phase

- F** lasts only one hour.
- G** takes approximately 7 hours.
- H** is twice as long as the G₁ phase.
- J** takes half as much time as the G₁ phase.

GS050014

Performance Indicator: Predict the outcome of a cross between parents of known genotype.

- 9** In pea plants, smooth peas (S) are dominant to dented peas (s), and yellow seeds (Y) are dominant to green seeds (y). If a pea plant homozygous recessive for both traits is crossed with a pea plant heterozygous for both traits, what is the percent probability that the offspring will have dented green seeds?

- A** 100%
- B** 50%
- C** 25%
- D** 0%

GS040216

Performance Indicator: Distinguish among tools and procedures best suited to conduct a specified scientific inquiry.

- 10** A science class investigated whether the acidity of water affects the growth of aquatic plants. They set up three aquariums containing water of different acidities and placed the same amount and type of plant in each aquarium. Data was collected on plant growth. Which tool would best have helped the class determine at what acidity level the plants grew the best?

- F** graduated cylinder
- G** pH meter
- H** light meter
- J** temperature probe

GS040326

Performance Indicator: Evaluate a protocol to determine the degree to which an engineering design process was successfully applied.

- 11** A research company wants to design a new type of artificial heart valve that will be less likely to be rejected by a person's immune system. Which step in the design process should the company perform before building a prototype of the heart valve?

- A** Find test subjects for the new heart valve.
- B** Determine how to manufacture the new heart valve.
- C** Conduct research on existing artificial heart valves.
- D** Evaluate the performance of the artificial heart valve.

GS050015

Performance Indicator: Evaluate the overall benefit to cost ratio of a new technology.

- 12** What is the cost benefit for a company producing a drought-resistant crop?

- F** The crop can be successfully raised in a wider range of climates.
- G** The crop will produce more each year.
- H** The crop can be grown in any type of soil.
- J** Farmers can plant the crop at any time of the year.

GS040298

Performance Indicator: Use design principles to determine if a new technology will improve the quality of life for an intended audience.

13 A health care company is developing a new type of humidifier that will help alleviate symptoms associated with common allergies such as sore throat and dry sinuses. A humidifier increases the amount of moisture in the air, thereby reducing allergy symptoms. Which step will most help the company determine if its humidifier is more effective than humidifiers currently available?

- A** finding volunteers to use the new humidifiers
- B** determining the cost of producing the humidifiers
- C** giving away free humidifiers for the public to try
- D** testing the humidifiers in a controlled investigation

GS050017

Reporting Category: Cells
Numbers 14 through 21

Performance Indicator: Identify the cellular organelles associated with major cell processes.

14 Protein synthesis occurs on which cellular organelle?

- F** chloroplast
- G** ribosome
- H** mitochondrion
- J** nucleus

GS040273

Performance Indicator: Distinguish between prokaryotic and eukaryotic cells.

15 Which is the most accurate description of a eukaryotic cell?

- A** moves using cilia
- B** contains a nucleus
- C** produces food by photosynthesis
- D** reproduces only by binary fission

GS040044

Performance Indicator: Distinguish among proteins, carbohydrates, lipids, and nucleic acids.

16 Amino acids are a structural component of which macromolecule?

- F** lipids
- G** proteins
- H** carbohydrates
- J** nucleic acids

GS040190

Performance Indicator: Identify positive tests for carbohydrates, lipids, and proteins.

17 When Benedict's solution is added to an unknown substance and then heated in a hot water bath, the solution turns an orange-brown color. This indicates the presence of which molecule?

- A** lipids
- B** proteins
- C** carbohydrates
- D** nucleic acids

GS040283

Performance Indicator: Identify how enzymes control chemical reactions in the body.

18 How does the reduction in activation energy by an enzyme affect a chemical reaction?

- F** The products are not stable.
- G** The reaction proceeds at a faster rate.
- H** Less energy is gained from the reaction.
- J** The reaction is less efficient when the enzyme is present.

GS040096

Performance Indicator: Determine the relationship between cell growth and cell reproduction.

19 What must occur during the cell cycle to ensure proper division of the chromosomes?

- A** The cell must grow in size.
- B** The mitochondria must divide.
- C** The DNA of the cell must replicate.
- D** The cell membrane must dissolve.

GS040097

Performance Indicator: Predict the movement of water and other molecules across selectively permeable membranes.

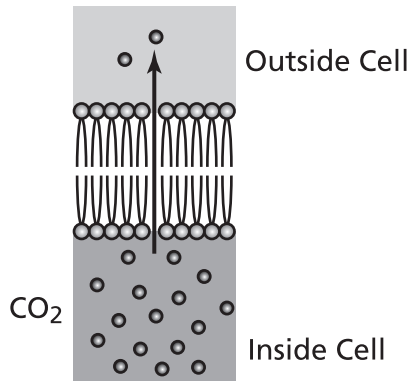
20 What will most likely occur when a cell is placed into a saline solution that has a higher salt concentration than inside the cell?

- F** Water molecules will move into the cell.
- G** Salt molecules will move out of the cell.
- H** Salt molecules will move until the salt concentration is the same inside and outside of the cell.
- J** Water molecules will move until the salt concentration is the same inside and outside of the cell.

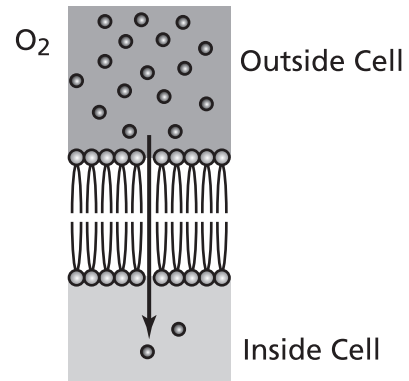
GS040278

Performance Indicator: Compare and contrast active and passive transport.

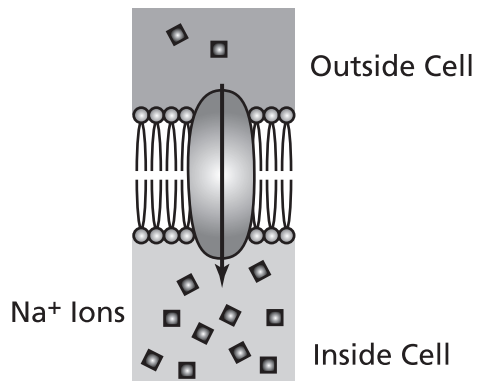
21 Which diagram represents active transport?



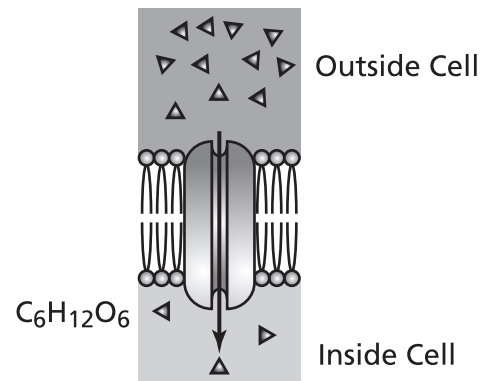
A



C



B



D

GS040127

Reporting Category:
Numbers 22 through 28**Interdependence**

Performance Indicator: Predict how population changes of organisms at different trophic levels affect an ecosystem.

22 In a grassland ecosystem, a certain species of predator preys mainly on large herbivores. Which would most likely result if there were a sudden decrease in the predator population?

- F** a decrease in primary consumer populations
- G** an increase in grassland biodiversity
- H** overgrazing of producers
- J** greater competition among predators

GS040158

Performance Indicator: Interpret the relationship between environmental factors and fluctuations in population size.

23 A delay in warm spring weather in an ecosystem could result in decreased populations of primary consumers. What would best explain the decrease in primary consumers?

- A** a decrease in the availability of producers
- B** an increase in competition with secondary consumers
- C** a decrease in the local concentration of atmospheric oxygen
- D** an increase in the activity of scavengers and decomposers

GS040159

Performance Indicator: Determine how the carrying capacity of an ecosystem is affected by interactions among organisms.

24 Which would most likely increase the carrying capacity for a deer population in a forest ecosystem?

- F** a decrease in parasites
- G** a decrease in predators
- H** a decrease in producers
- J** a decrease in competitors

GS040066

Performance Indicator: Predict how various types of human activities affect the environment.

25 Scientists hypothesize that the use of certain pesticides is causing a decline in the population of honeybees, which pollinate many fruit and vegetable plants. How would a decline in the honeybee population most impact the environment?

- A** Populations of plants that reproduce asexually would decline.
- B** Populations of primary consumers would increase.
- C** Production of some food crops would decrease.
- D** Flowering plants would produce more nectar.

GS040102

Performance Indicator: Make inferences about how a specific environmental change can affect the amount of biodiversity.

26 The kudzu plant was imported into the United States as an ornamental plant and was later planted to help reduce soil erosion. Kudzu is a vine that grows in a wide range of conditions and soil types. Due to its rapid growth, the plant has taken over many native plant species, resulting in

- F** a decrease in biodiversity.
- G** a decrease in rate of cellular respiration.
- H** an increase in surface runoff.
- J** an increase in habitat for native species.

GS040164

Performance Indicator: Predict how a specific environmental change may lead to the extinction of a particular species.

27 The spotted owl is an endangered species found in the northwestern United States. Which environmental condition would most likely lead to the extinction of the spotted owl?

- A** a drought that lasts for one year
- B** the clear-cutting of wildlife habitat
- C** the immigration of a new species of prey
- D** an abnormally cold winter

GS040009

Performance Indicator: Analyze factors responsible for the changes associated with biological succession.

28 Which environmental disturbance would most likely result in lichens colonizing an area?

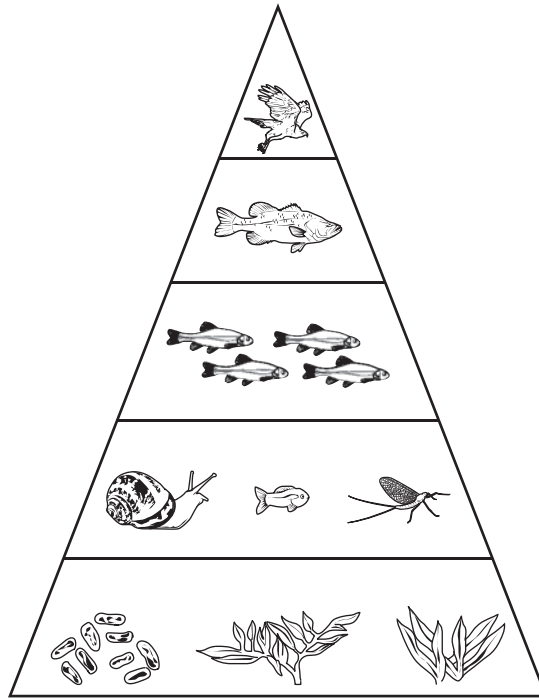
- F** the burning of a forest
- G** abandoning farm fields for many years
- H** the melting of a glacier that exposes rock
- J** clearing a meadow for new construction

GS040074

Reporting Category:
Numbers 29 through 32**Flow of Matter and Energy**

Performance Indicator: Interpret a diagram that illustrates energy flow in an ecosystem.

- 29** An energy pyramid is shown below.



As energy moves through the pyramid, the amount of available energy

- A** increases as the size of the organisms increases.
- B** doubles as it moves up each trophic level.
- C** remains the same as it is transferred to the next trophic level.
- D** decreases because it is released as heat into the environment.

GS040249

Performance Indicator: Distinguish between aerobic and anaerobic respiration.

30 *Clostridium botulinum* bacteria grow well in low-oxygen environments, including improperly canned foods. Which of these processes does *Clostridium botulinum* use to produce energy when in these low-oxygen environments?

- F** aerobic respiration
- G** anaerobic respiration
- H** photosynthesis
- J** chemosynthesis

GS040244

Performance Indicator: Compare and contrast photosynthesis and cellular respiration in terms of energy transformation.

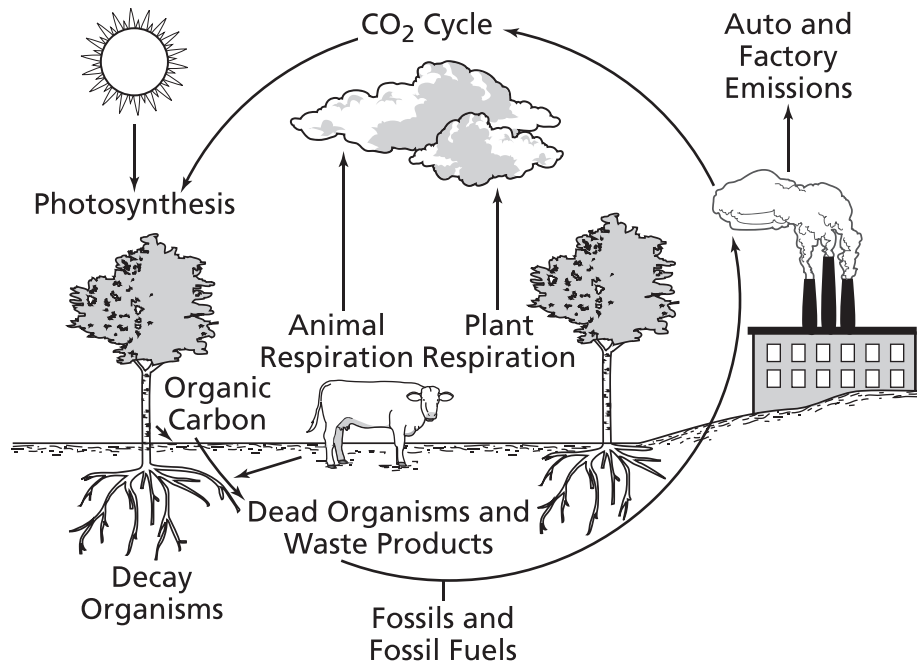
31 Photosynthesis converts light energy to stored chemical energy. What form of chemical energy is used in cellular respiration?

- A** glucose
- B** oxygen
- C** chlorophyll
- D** carbon

GS040368

Performance Indicator: Predict how changes in a biogeochemical cycle can affect an ecosystem.

32 A diagram of the carbon cycle is shown below.



Which of these could cause the amount of carbon dioxide in the atmosphere to decrease?

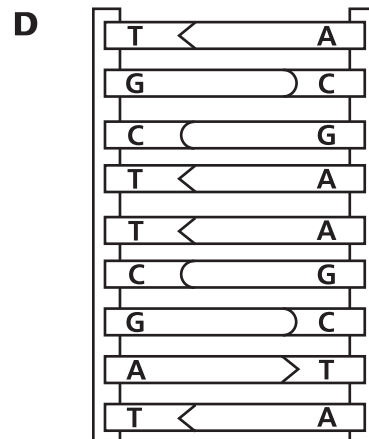
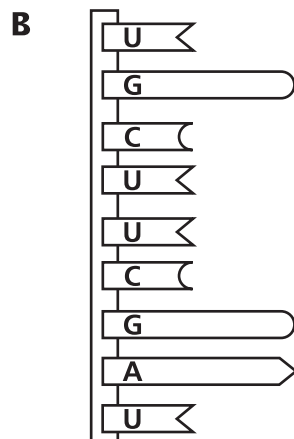
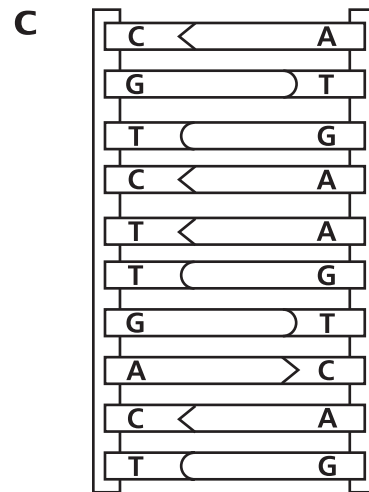
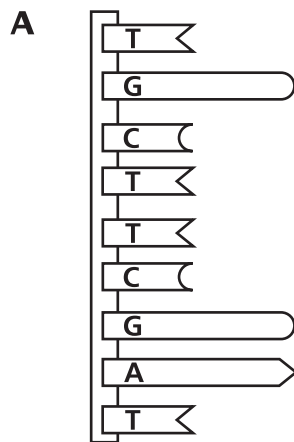
- F** increased burning of fossil fuels
- G** increased numbers of decomposers
- H** increased numbers of producers
- J** increased respiration in animals

GS040251

Reporting Category: Heredity
Numbers 33 through 41

Performance Indicator: Identify the structure and function of DNA.

33 Which diagram best represents a segment of a normal DNA molecule?



GS040279

Performance Indicator: Associate the process of DNA replication with its biological significance.

34 The main purpose of DNA replication is to

- F** capture sunlight.
- G** store energy.
- H** synthesize proteins.
- J** copy genetic information.

GS040372

Performance Indicator: Recognize the interactions between DNA and RNA during protein synthesis.

35 Which sequence depicts the correct order of protein synthesis within a cell?

- A** DNA → mRNA → amino acids → proteins
- B** DNA → amino acids → mRNA → proteins
- C** DNA → mRNA → proteins → amino acids
- D** DNA → proteins → amino acids → mRNA

GS040219

Performance Indicator: Determine the probability of a particular trait in an offspring based on the genotype of the parents and the particular mode of inheritance.

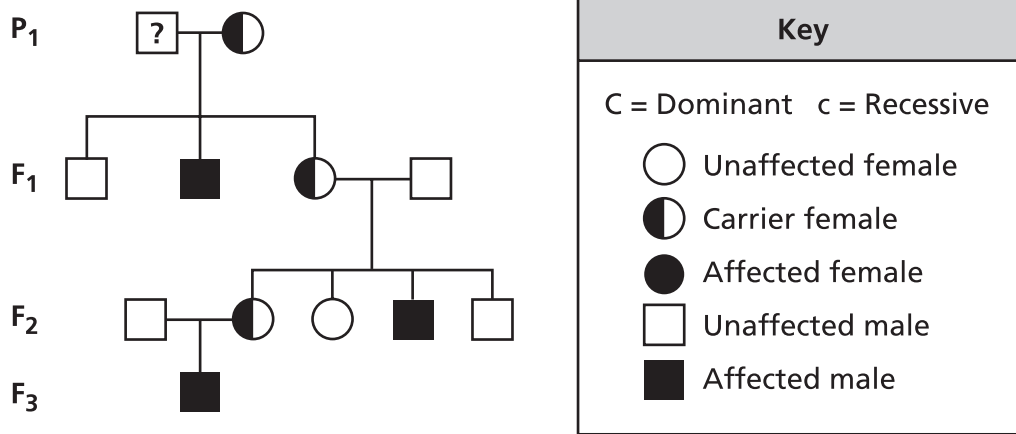
36 In Bengal tigers, the allele for an orange coat is dominant to the allele for a white coat. If a homozygous recessive tiger is crossed with a tiger heterozygous for coat color, what is the percent probability that one of the offspring will be orange?

- F** 0%
- G** 25%
- H** 50%
- J** 75%

GS040174

Performance Indicator: Apply pedigree data to interpret various modes of genetic inheritance.

37 The inheritance of a trait is shown in the pedigree below.



Based on the pedigree, what is the genotype of the male in the P₁ generation?

- A** $X^{C}Y^{c}$
- B** $X^{c}Y^{c}$
- C** $X^{C}Y$
- D** $X^{c}Y$

GS040221

Performance Indicator: Describe how meiosis is involved in the production of egg and sperm cells.

38 Which statement best explains the role of meiosis in the production of sex cells?

- F** to produce cells with half the DNA of the original cell
- G** to produce cells that are genetically identical to each other
- H** to combine the DNA of two identical cells
- J** to combine the DNA of two different cells

GS040270

Performance Indicator: Describe how meiosis and sexual reproduction contribute to genetic variation in a population.

39 Which best explains how meiosis is a contributing factor to genetic variation within a species?

- A** Meiosis reduces the number of mutations within an organism.
- B** Meiosis produces daughter cells that will contain identical chromosomes.
- C** Meiosis results in offspring that contain alleles from only one parent gamete.
- D** Meiosis allows for crossing over of chromosomes, resulting in new gene combinations.

GS040223

Performance Indicator: Determine the relationship between mutations and human genetic disorders.

40 Down syndrome (Trisomy 21) and Klinefelter's syndrome (XXY) are both a result of an extra chromosome due to which type of mutation?

- F** deletion
- G** frameshift
- H** insertion
- J** nondisjunction

GS040110

Performance Indicator: Evaluate the scientific and ethical issues associated with gene technologies: genetic engineering, cloning, transgenic organism production, stem cell research, and DNA fingerprinting.

41 What is the main ethical argument against the use of transgenic organisms, which have DNA from another organism?

- A** Transgenic organisms may cause unknown reactions in an ecosystem.
- B** Transgenic organisms may eliminate certain harmful diseases.
- C** Transgenic organisms may increase food production in many crops.
- D** Transgenic organisms may prevent harmful mutations.

GS040375

Reporting Category: Biodiversity and Change
Numbers 42 through 47

Performance Indicator: Compare and contrast the structural, functional, and behavioral adaptations of animals or plants found in different environments.

42 Walruses, found in the Arctic regions, have a six-inch layer of body fat. River otters, found in rivers in parts of the United States and Canada, have a thick undercoat and an outer coat of coarse guard hairs. These structures most likely help the walrus and the otter

- F** stay warm.
- G** transfer energy to offspring.
- H** move through their environment.
- J** resist infection.

GS040136

Performance Indicator: Recognize the relationship between form and function in living things.

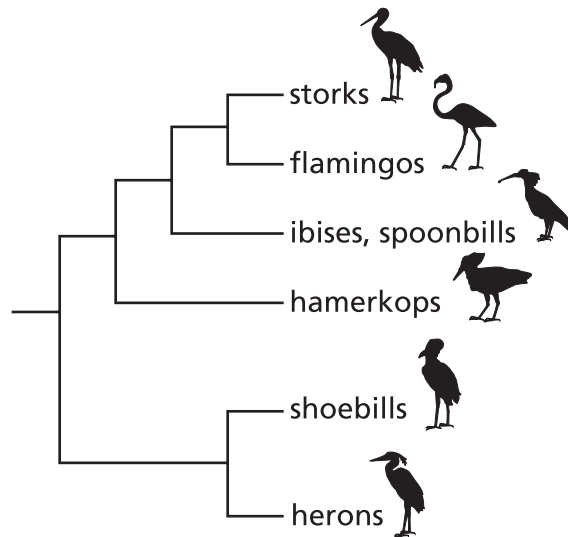
43 A certain species of lynx that lives in arctic regions has very large and furry paws. Which best explains how these paws help the lynx adapt to its habitat?

- A** increase the lynx's ability to catch prey
- B** provide camouflage for the lynx
- C** help the lynx attract a mate
- D** help the lynx maintain body temperature

GS040287

Performance Indicator: Recognize the relationships among environmental change, genetic variation, natural selection, and the emergence of a new species.

- 44** The diagram below shows that different wading birds arose from a single ancestor.



Which of these does not provide an explanation for how different wading birds arose from a single ancestor?

- F** Random genetic changes occurred in the ancestral population.
- G** Gradual genetic divergence occurred between isolated populations.
- H** Environmental factors selected for genetic change in the population.
- J** Dominant traits increased survival in the population more than recessive traits did.

GS000733

Performance Indicator: Describe the relationship between the amount of biodiversity and the ability of a population to adapt to a changing environment.

- 45** A section of rain forest was isolated from the rest of the rain forest by logging. As a result, a population of beetles was isolated from other members of the same beetle species in the main rain forest.

Which of the following is the most likely effect on the isolated population of beetles?

- A** The isolated population will begin to breed with other beetle species.
- B** The isolated population may start to differ from the population of the same species living in the main rain forest if conditions in their isolated forest change.
- C** The isolated population will go extinct without interaction with beetles from the main rain forest if conditions in their isolated forest change.
- D** The isolated population will grow uncontrollably without competition from beetles in the main rain forest.

GS005086

Performance Indicator: Apply evidence from the fossil record, comparative anatomy, amino acid sequences, and DNA structure that support modern classification systems.

- 46** A scientist studied a specific DNA segment from four different species. The table below shows the base sequence for each species.

Species	Base Sequence
1	CTT ACT GCT
2	CTA ACC GGT
3	CTT AGT CGT
4	CTA ACT GCT

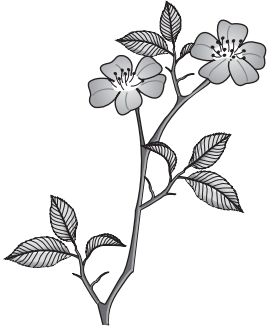
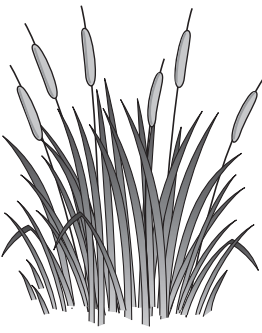
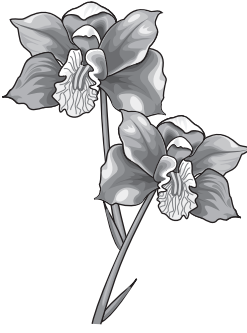

According to the results above, which two species are most closely related?

- F** Species 1 and 3
- G** Species 2 and 4
- H** Species 2 and 3
- J** Species 1 and 4

GS005105

Performance Indicator: Infer relatedness among different organisms using modern classification systems.

47 The chart below shows the classification of four different organisms.

	Organism 1	Organism 2	Organism 3	Organism 4
				
Kingdom	Plantae	Plantae	Plantae	Plantae
Phylum (Division)	Magnoliophyta	Magnoliophyta	Magnoliophyta	Magnoliophyta
Class	Magnoliopsida	Liliopsida	Liliopsida	Magnoliopsida
Order	Rosales	Typhales	Orchidales	Rosales
Family	Rosaceae	Typhaceae	Orchidaceae	Hydrangeaceae

According to the classification chart, which two organisms are most closely related?

- A** Organisms 1 and 3
- B** Organisms 1 and 4
- C** Organisms 2 and 3
- D** Organisms 2 and 4

GS000916

Answer Key with Reporting Category and Performance Indicator

Reporting Category 1: Inquiry, Technology and Engineering, Mathematics		
Item Number	Correct Answer	Performance Indicator
1	C	3210.Inq.1 Select a description or scenario that reevaluates and/or extends a scientific finding.
2	J	3210.Inq.2 Analyze the components of a properly designed scientific investigation.
3	A	3210.Inq.3 Determine appropriate tools to gather precise and accurate data.
4	J	3210.Inq.4 Evaluate the accuracy and precision of data.
5	C	3210.Inq.5 Defend a conclusion based on scientific evidence.
6	G	3210.Inq.6 Determine why a conclusion is free of bias.
7	C	3210.Inq.7 Compare conclusions that offer different, but acceptable, explanations for the same set of experimental data.
8	G	3210.Math.1 Interpret a graph that depicts a biological phenomenon.
9	C	3210.Math.2 Predict the outcome of a cross between parents of known genotype.
10	G	3210.TE.1 Distinguish among tools and procedures best suited to conduct a specified scientific inquiry.
11	C	3210.TE.2 Evaluate a protocol to determine the degree to which an engineering design process was successfully applied.
12	F	3210.TE.3 Evaluate the overall benefit to cost ratio of a new technology.
13	D	3210.TE.4 Use design principles to determine if a new technology will improve the quality of life for an intended audience.

Answer Key with Reporting Category and Performance Indicator

Reporting Category 2: Cells

Item Number	Correct Answer	Performance Indicator
14	G	3210.1.1 Identify the cellular organelles associated with major cell processes.
15	B	3210.1.2 Distinguish between prokaryotic and eukaryotic cells.
16	G	3210.1.3 Distinguish among proteins, carbohydrates, lipids, and nucleic acids.
17	C	3210.1.4 Identify positive tests for carbohydrates, lipids, and proteins.
18	G	3210.1.5 Identify how enzymes control chemical reactions in the body.
19	C	3210.1.6 Determine the relationship between cell growth and cell reproduction.
20	J	3210.1.7 Predict the movement of water and other molecules across selectively permeable membranes.
21	B	3210.1.8 Compare and contrast active and passive transport.

Answer Key with Reporting Category and Performance Indicator

Reporting Category 3: Interdependence

Item Number	Correct Answer	Performance Indicator
22	H	3210.2.1 Predict how population changes of organisms at different trophic levels affect an ecosystem.
23	A	3210.2.2 Interpret the relationship between environmental factors and fluctuations in population size.
24	J	3210.2.3 Determine how the carrying capacity of an ecosystem is affected by interactions among organisms.
25	C	3210.2.4 Predict how various types of human activities affect the environment.
26	F	3210.2.5 Make inferences about how a specific environmental change can affect the amount of biodiversity.
27	B	3210.2.6 Predict how a specific environmental change may lead to the extinction of a particular species.
28	H	3210.2.7 Analyze factors responsible for the changes associated with biological succession.

Answer Key with Reporting Category and Performance Indicator

Reporting Category 4: Flow of Matter and Energy

Item Number	Correct Answer	Performance Indicator
29	D	3210.3.1 Interpret a diagram that illustrates energy flow in an ecosystem.
30	G	3210.3.2 Distinguish between aerobic and anaerobic respiration.
31	A	3210.3.3 Compare and contrast photosynthesis and cellular respiration in terms of energy transformation.
32	H	3210.3.4 Predict how changes in a biogeochemical cycle can affect an ecosystem.

Answer Key with Reporting Category and Performance Indicator

Reporting Category 5: Heredity

Item Number	Correct Answer	Performance Indicator
33	D	3210.4.1 Identify the structure and function of DNA.
34	J	3210.4.2 Associate the process of DNA replication with its biological significance.
35	A	3210.4.3 Recognize the interactions between DNA and RNA during protein synthesis.
36	H	3210.4.4 Determine the probability of a particular trait in an offspring based on the genotype of the parents and the particular mode of inheritance.
37	C	3210.4.5 Apply pedigree data to interpret various modes of genetic inheritance.
38	F	3210.4.6 Describe how meiosis is involved in the production of egg and sperm cells.
39	D	3210.4.7 Describe how meiosis and sexual reproduction contribute to genetic variation in a population.
40	J	3210.4.8 Determine the relationship between mutations and human genetic disorders.
41	A	3210.4.9 Evaluate the scientific and ethical issues associated with gene technologies: genetic engineering, cloning, transgenic organism production, stem cell research, and DNA fingerprinting.

Answer Key with Reporting Category and Performance Indicator

Reporting Category 6: Biodiversity and Change

Item Number	Correct Answer	Performance Indicator
42	F	3210.5.1 Compare and contrast the structural, functional, and behavioral adaptations of animals or plants found in different environments.
43	A	3210.5.2 Recognize the relationship between form and function in living things.
44	J	3210.5.3 Recognize the relationships among environmental change, genetic variation, natural selection, and the emergence of a new species.
45	B	3210.5.4 Describe the relationship between the amount of biodiversity and the ability of a population to adapt to a changing environment.
46	J	3210.5.5 Apply evidence from the fossil record, comparative anatomy, amino acid sequences, and DNA structure that support modern classification systems.
47	B	3210.5.6 Infer relatedness among different organisms using modern classification systems.